

4(d) RULE EVALUATION AND RECOMMENDED DETERMINATION

FMEP SUBMITTED BY: Oregon Department of Fish and Wildlife

FISHERIES OR AREA: Steelhead, trout, sturgeon and warmwater fisheries potentially affecting listed Lower Columbia River steelhead (*Oncorhynchus mykiss*) in the Lower Columbia River mainstem tributaries, Lower Willamette River tributaries, Clackamas River, and Sandy River.

EVOLUTIONARILY SIGNIFICANT UNIT (ESU): Lower Columbia River steelhead (*Oncorhynchus mykiss*)

4(d) RULE LIMIT: Limit 4

TRACKING NUMBER: NWR/4d/04/2001/007

DATE:

The Oregon Department of Fish and Wildlife (ODFW) has submitted a Fisheries Management and Evaluation Plan (FMEP) for their tributary fisheries that may affect listed steelhead in the Lower Columbia River (LCR) ESU (ODFW 2001a). This plan was submitted for NOAA's National Marine Fisheries Service (NOAA Fisheries) approval under limit 4 of the anadromous fish 4(d) Rule (50 CFR 223.203(b)(4); July 10, 2000, 65 FR 42422).

EVALUATION

The LCR steelhead ESU is listed as threatened under the Endangered Species Act (ESA). The 4(d) Rule for the LCR steelhead ESU states that the prohibitions of paragraph (a) of the rule do not apply to fishery harvest activities provided that:

- Fisheries are managed in accordance with a NOAA Fisheries-approved FMEP, and
- Fisheries are implemented in accordance with a letter of concurrence from NOAA Fisheries.

NOAA Fisheries can approve an FMEP if it adequately addresses the criteria specified below. The following is an evaluation of whether the submitted FMEP adequately addresses the criteria for limit 4 of the 4(d) Rule for Lower Columbia River steelhead.

Limit 4 Criteria and FMEP Evaluation

Clearly defines its intended scope and area of impact.

This FMEP addresses all tributary fisheries that affect or could potentially affect listed steelhead populations on the Oregon side of the LCR winter steelhead ESU. These fisheries will occur in the lower Willamette River and its tributaries, including the Clackamas River, and the Columbia River tributaries from the mouth of Hood River downstream to the north end of Sauvie Island (near the town of St. Helens, Oregon), including the Sandy River (Figure 1). The fishery management area is described further in section 1.2.1 of the FMEP. Table 1 summarizes the fisheries typically conducted in the action area, and indicates the method of consideration under the ESA. The FMEP excludes those mainstem Columbia River fisheries managed under *U.S. v. Oregon* and ocean fisheries that may encounter this ESU. The mainstem Columbia River fisheries undergo section 7 consultation initiated by the parties to *U.S. v. Oregon*, and the ocean fisheries undergo section 7 consultation initiated by the Pacific Fisheries Management Council. Tributary fisheries on the Washington side of the Lower Columbia River ESU are managed under the sole authority of the state of Washington. Washington Department of Fish and Wildlife has also submitted an FMEP for approval by NOAA Fisheries (WDFW 2003).

The fisheries are managed to prohibit all retention of unmarked, adult steelhead. Only steelhead that are adipose fin-clipped may be retained by anglers. Winter steelhead are vulnerable to capture when they return to their natal rivers from December through May. ESA listed winter steelhead are most likely to be caught by anglers targeting hatchery winter steelhead or spring chinook salmon (Table 1). Juvenile steelhead may also be present throughout the management area. Juvenile steelhead are most likely to be captured by anglers while fishing for resident trout and warmwater fishes during the summer.

Sets forth the management objectives and the performance indicators for the plan.

This LCR steelhead FMEP specifies that the management objective is to conduct fisheries to harvest hatchery winter steelhead and other fish species in a manner that is consistent with recovery of the ESA listed steelhead. The overall management intent is to implement permanent angling regulations in all streams within the LCR steelhead ESU in Oregon that require the release of all unmarked adult steelhead. Only adipose-clipped adult steelhead may be retained in the fisheries.

The performance indicators for the management objectives of the LCR steelhead FMEP are fully described in sections 1.1.1 and 3.1. Included are indicators addressing population parameters and measures of fishery performance. The primary fish population indicators for the LCR steelhead ESU consist of counts at Marmot Dam (Sandy River population), North Fork Dam (Clackamas River population), North Scappoose Creek (Scappoose Creek population), and estimates derived from harvest card assessments. Counts from Marmot Dam on the Sandy River and North Fork Dam on the Clackamas River will be the primary sources of information with inferences made from this data for the remaining waters in the ESU within the North Willamette Fish District (ODFW management area). If funding is available, a population model will be developed that provides a total population prediction based on the Marmot and North Fork counts.

Performance indicators also include fishery indicators for monitoring fishery performance and regulating impacts within the prescribed limits. The primary fishery indicators include creel survey programs that provide catch rate, fishing effort, and catch composition (size, age, mark rates, etc.). Annual statistical creel programs on the Clackamas and Sandy Rivers, designed to provide a comprehensive analysis of the fishery, utilizing records of angling effort, catch, harvest, hatchery/wild ratio, and the distribution of angler pressure, will be conducted if funding is available. These surveys are important for providing detailed information on fishing effort and fisheries impacts, and when combined with escapement data can provide a complete evaluation of the status of the steelhead populations in these basins.

Table 1. Fisheries in Oregon tributaries that may impact Listed Lower Columbia River steelhead.

Fishery	Area	Harvest method	Typical dates open	Effect on Lower Columbia River steelhead
Spring chinook	Lower Willamette River Lower Clackamas River	Angling only	All Year	B
	Lower Sandy River	Angling only	Feb.1 - Oct. 31	B
Fall chinook	Lower Sandy River	Angling only	Feb. 1 - Oct. 31	D
Coho	Eagle Creek	Angling only	Sept. 1 - Oct. 31	D
	Lower Sandy River Lower Clackamas River Lower Willamette River	Angling only	Sept. 1 - Oct. 31	D
Winter steelhead (hatchery)	Herman Creek Eagle Creek	Angling only	April 1 - October 31	A
	Lower Clackamas River Lower Sandy River	Angling only	All Year	A
Summer steelhead (hatchery)	Lower Sandy River Herman Creek Eagle Creek	Angling only	All Year	B
	Lower Clackamas River Lower Sandy River	Angling only	All Year	B
Sturgeon	Lower Willamette River	Angling only	All Year	D
Trout	Columbia River Tributaries	Angling only	Late May - Late Oct.	C
	Standing waters	Angling only	All Year	D
Lamprey	Willamette Falls	various	June 1 - August 31	D
Warmwater species	Standing waters Willamette mainstem	Angling only	Year round	D

A = winter steelhead target fishery, B = potential for incidental encounter of winter steelhead adults, C = potential for incidental encounter of winter steelhead juveniles, D = winter steelhead not encountered.

In addition, NOAA Fisheries evaluates whether the FMEP adequately addresses the following criteria:

4)(i)(A) Defines populations within affected ESUs, taking into account: spatial and temporal distribution, genetic and phenotypic diversity, and other appropriate identifiably unique biological and life history traits.

The FMEP identifies the management unit as those naturally produced steelhead that return to streams in the LCR steelhead ESU in Oregon excluding those that return to the Hood River (this population is addressed in a separate FMEP: ODFW 2000a). The management unit includes those populations in Oregon from RM 87 up to RM 169.4 of the mainstem Columbia River and up the Willamette River from the mouth to RM 26 (Willamette Falls). Within this area are two populations that are used as indicator populations for the rest of the naturally produced spawning steelhead populations within the management unit (see Section 1.2.1 for area description). The indicator populations are in the Sandy River and the Clackamas River, where dam counts provide data needed to estimate population abundance and productivity. These populations are in the two largest subbasins within this FMEP management unit, have the best scientific data available, have steelhead hatchery programs supporting tributary fisheries, and support the greatest amount of fishing effort. For these reasons NMFS will use these populations as the basis for the evaluation of the FMEP. These indicator populations may not be representative of the steelhead that spawn naturally in the smaller tributaries within the management unit (Table 2). In these smaller gorge populations, there are no hatchery programs supporting fisheries, and fishing is prohibited except in the Eagle Creek and Herman Creek basins where effort is low. Harvest impacts in these two basins are expected to be less than those that would occur in the Sandy and Clackamas Rivers. The Willamette/Lower Columbia River Technical Recovery Team (TRT) has identified a number of historical populations in these subbasins and the smaller tributaries (Table 2). Until recovery plans are developed by the TRT and others, management at the population level is consistent with the NOAA Fisheries' technical document "Viable Salmonid Populations and Recovery of Evolutionarily Significant Units" recommends this type of interim approach where information is limited (McElhany *et al.* 2000).

Further information on the population structure throughout the LCR ESU can be found in section 1.3.2 "Description of current status of each population relative to its Viable Salmonid Populations thresholds."

All of the other listed ESUs in the Columbia basin are either not affected by the fisheries included in this FMEP or impacts from the fisheries will be addressed in other FMEPs or section 7 consultations. These ESUs include Upper Willamette River spring chinook salmon, upper Willamette River winter steelhead, LCR chinook salmon, LCR chum salmon, Mid-Columbia steelhead and Snake River steelhead.

Table 2. Historical populations of steelhead in the Oregon Portion of the Lower Columbia River ESU (Myers *et al.* 2002).

Main Population	Sub Populations
Clackamas River	Johnson Creek
	Eagle Creek
	Mainstem and Upper Clackamas Winter Run
	Collowash River
Sandy River	Bull Run Winter Run
	Little Sandy Winter Run
	Salmon River Winter Run
	Zig Zag River Winter Run
Lower Gorge Tributaries (Winter Run)	Bridal Veil Creek
	Wahkeena Creek
	Multnomah Creek
	Moffet Creek
	Tanner Creek
Upper Gorge Tributaries (Winter Run)	Eagle Creek
	Herman Creek
	Gorton Creek
	Viento Creek
	Lindsey Creek
	Phelps Creek

Note that the TRT did not include the winter run steelhead in Scapoose Creek which is monitored by ODFW.

4)(i)(B) Uses the concepts of “viable” and “critical” salmonid population thresholds, consistent with Viable Salmonid Populations (VSP) concepts in “Viable Salmonid Population.”

The regulations in the 4(d) Rule state that an FMEP must use the concepts of “viable” and “critical” thresholds (McElhany *et al.* 2000) in a manner such that fishery management actions: (a) recognize significant differences in risk associated with viable and critical population threshold states; and (b) respond accordingly to minimize long-term risks to population

persistence. Harvest actions that impact populations at or above viable threshold must maintain the population or management unit at or above the viable level. Impacts on populations above critical levels but not at viable levels (demonstrated with high degree of confidence) must not appreciably slow achievement to viable function. Impacts on populations functioning at or below critical threshold must not appreciably increase genetic and demographic risks facing the population and must be designed to permit achievement of viable functions, unless the FMEP demonstrates the likelihood of survival and recovery of the entire ESU in the wild would not be appreciably reduced by greater risks to an individual population.

The harvest regime specified in the LCR FMEP takes into account the different risks facing a population depending on the status of the population (i.e. critical or viable state). All fisheries described in the FMEP require all unmarked steelhead to be released unharmed. Only fin-clipped hatchery fish can be retained. Because of this selective harvest regime, impacts on listed fish will depend on the encounter rate of naturally produced fish in the fisheries, the associated catch and release mortality, and illegal harvest. Annual fisheries impacts are expected to be approximately 2.5% of the naturally produced steelhead returning to the ESU based on the assumed post-release mortality rate of 5% and a maximum fishery interception rate for the naturally produced population of 40%. This includes the additional fisheries mortality from angler non-compliance (illegal harvest) which is expected to be very low due to the greater than 90% angler compliance to fisheries regulations. If one of the populations in the management area drops below a critical threshold (or is expected to in the foreseeable future), fishery impacts will be reduced even further. Section 3.5.1 of the FMEP describes the fishery closures that will be implemented if a population is at or below critical thresholds.

Since no change in fisheries management will occur if the listed populations rebound to healthy abundance levels (i.e., selective fisheries for hatchery fish only continue), viable threshold levels were purposefully not specified in the FMEP. This was deemed appropriate because of the low level of impacts on listed steelhead. Impacts on winter steelhead will never increase substantially under the selective fishing regime because of the low catch rates observed in the LCR steelhead management area. Fisheries impacts will not be increased beyond the incidental mortality levels associated with catch-and-release fishing at any population status that is above the critical level thresholds. Impacts will likely range for 0% to 2.5% at any abundance level.

NOAA Fisheries' "Viable Salmon Populations and Recovery of ESUs" document describes four key parameters for evaluating the status of salmonid populations (McElhany *et al.* 2000). These parameters are population size (abundance), population growth rate (productivity), spatial structure, and diversity. The LCR steelhead FMEP describes a preliminary critical threshold for the Sandy River and Clackamas River winter steelhead populations. The estimates should be considered to be preliminary because biological information is limited. The thresholds may be revised in the future based on further information and recovery planning efforts by the TRT. The information produced by the TRTs will be incorporated into the 5-yr comprehensive review process for this FMEP. This approach is consistent with the guidelines provided in the

VSP technical document (see page 30 of McElhany *et al.* 2000). Below is an evaluation of whether the FMEP adequately addresses the VSP parameters for the LCR steelhead population.

Population Size

Critical abundance thresholds were developed for the Sandy River winter steelhead population measured at Marmot Dam and for the Clackamas River winter steelhead population utilizing escapement estimates to North Fork Dam (see section 1.3.1 of the FMEP). ODFW estimated that the maximum seeding level (producing the maximum number of recruits) in the Sandy River to be 1,677 spawners, and in the Clackamas River that number is 1,396 spawners. The interim critical abundance thresholds were determined from these estimates (20% of the maximum seeding) for the Sandy River and Clackamas River as being 336 and 279, respectively. Given the guidelines established for critical population size in McElhany *et al.* (2000), and the modeling efforts by ODFW (Chilcote 2001), the preliminary critical thresholds appear to be reasonable.

As previously stated, viable abundance thresholds were purposefully not identified because selective fishing will continue indefinitely into the future. Fishery impacts will be from catch-and-release mortality and, in the case of the LCR steelhead management area, will likely not change substantially at any population status.

Population Growth Rate

The viable thresholds for productivity are defined as: in the short-term, a generally increasing trend in escapement; and for the long-term, an average replacement rate equal to one. If the populations meet these viable thresholds, the populations would not be declining over the long term.

Since the fishery mortalities specified in the FMEP are so low (in the range of 0% to 2.5%), the fisheries will not likely affect the productivity, to any extent measurable, of either population in the LCR steelhead management area. At these low impact levels, it is not possible to separate the effect the fisheries may have on the long-term productivity from natural variability in productivity.

The population growth rates for the Sandy River and Clackamas River naturally produced steelhead populations were considered impacted by hatchery practices that occurred prior to 1998 (Chilcote 1998). Hatchery summer steelhead and non-endemic hatchery winter steelhead were permitted to spawn naturally in listed winter steelhead habitat reducing the productivity of the naturally produced winter steelhead population by an estimated 27% (Chilcote 1998). Population productivity should improve for naturally produced steelhead populations in the Sandy and Clackamas river because hatchery fish are now prevented from passing above Marmot Dam and North Fork Dam into the primary spawning areas. The ODFW proposals in the FMEP are not expected to contribute to the reduction or retard the population growth rate of the LCR steelhead populations.

Spatial Structure

It may be possible for fisheries to affect the spatial structure of a population and/or ESU. For example, a fishery could target a certain portion of the run, which may result in a substantial decrease in the number of spawners destined to a particular spawning location or population through time. The early portion of a run of steelhead may be the fish that migrate the farthest upstream. If the fishery harvests the early returns, the spawning distribution of a population may change. Therefore, a fishery designed to protect the long-term integrity of naturally produced populations should be managed to explicitly avoid or minimize such disproportional effects.

Based on NOAA Fisheries' assessment of the potential impacts from the tributary fisheries on the spatial structure, the selective fishing regime in the LCR steelhead FMEP is expected to reduce any potential adverse effects on the spatial structure of the LCR winter steelhead populations. Because the fishery allows for the retention of only marked hatchery steelhead and is expected to handle up to 40% of the naturally produced returning adults over the entire run, this should not cause the fishery to be selective for distinct proportions of returning spawners. Thus, the fishery should not affect naturally produced adult steelhead spatial distribution in the LCR steelhead ESU.

The spatial structure of populations within the ESU are generally a function of habitat size and distribution. The proposed fisheries should not affect habitat and the low fishery impacts should not reduce populations to levels where spatial effects are exacerbated. The loss of historic habitat from degradation has contributed to the loss of the spatial integrity of steelhead populations in the ESU more than any other factor. In the Sandy River, the long term goal is an escapement of 1,677 spawners; in the Clackamas River this escapement goal is 1,396 spawners. These are estimated to be the seeding level of the current habitat that will produce the maximum number of adults returning to the basin.

Diversity

As stated above, actions described in the FMEP will not likely affect within- and among-population diversity of the ESU. The fisheries will not likely impact a certain portion of the run to a greater extent than another. Diversity parameters are most likely influenced by habitat and the effects of natural spawning by hatchery steelhead. Marked hatchery steelhead that are caught in the proposed fisheries can be retained, and this can minimize the potential effects of hatchery steelhead on the diversity of the naturally produced population. The small, proposed fishery impacts are not expected to affect the diversity of the population by selecting for specific characteristics.

4(i)©) Sets escapement objectives or maximum exploitation rates for each management unit or population based on its status, and assures that those rates or objectives are not exceeded.

The fishery management strategy in the LCR FMEP is to conduct consumptive fisheries for marked adult hatchery steelhead, resident rainbow trout, hatchery salmon, sturgeon and warmwater species. As described above, the critical thresholds for listed steelhead are escapements of at least 336 at Marmot Dam and at least 279 at North Fork Dam. The long-term escapement objective for naturally produced adult winter steelhead is to have annual average escapements at Marmot Dam of 1,730 (from the Sandy Subbasin Plan) and 3,000 over North Fork Dam. The long-term escapement goal at North Fork Dam is based on the subbasin plan developed in the 1990s and does not reflect recent efforts by ODFW. The long-term goal is expected to be adjusted to reflect the level of maximum seeding or approximately 1,400 naturally produced spawners.

The overall mortality rate for catch-and-release fisheries depends on the encounter rate of naturally produced fish (percentage of run actually caught and released) in the fisheries and the mortality rate associated with being caught and released (hook-and-release mortality) and the illegal harvest of naturally produced fish. The best available information suggests that fishing mortality rates for winter steelhead in the LCR steelhead management area is expected to be less than 2.0% (section 1.4.1 of the FMEP). This estimate was derived using a 40% encounter rate and a 5% catch-and-release mortality rate (Hooton 1987).

ODFW performed a number of PVA model runs for 27 steelhead populations to assess the impact of fisheries mortality on the status and recovery of steelhead in Oregon. The model looked at a range fisheries mortalities from 0% to 75%. The results were stated in terms of the probability of the population becoming extinct in 50 years at each mortality rate. For most populations the modeling suggested that the probability of extinction was essentially zero as long as fisheries mortality rates remained less than 30%. As mortality rates became greater than 40% the probability of extinction increased dramatically. Furthermore, once the probability of extinction increased beyond 0.05, the transition to an extinction probability of 1.00 was very rapid. In other words, once mortality rates increase sufficiently to cause the probability of extinction to exceed 0.05, any additional mortality would cause a rapid increase in the likelihood of extinction. Because the transition from low to high risk happens so rapidly, there is little room for error (in the model or the measurements of mortality rates). To address this concern, ODFW has set the maximum fisheries mortality limit to 20%. This conservative approach was used to provide a buffer for errors, even though the model results suggested that management under a 40% limit was unlikely to cause extinction.

Because encounter rates are variable, impacts to juvenile steelhead, and due to the potential for illegal harvest, total impacts are expected to be less than 2.5% of the naturally produced winter steelhead in the Oregon portion of the LCR steelhead ESU. The steelhead fishery will continue as proposed as long as the rolling average naturally produced spawner escapements are above 336 at Marmot Dam and 279 at North Fork Dam. The trend in naturally produced steelhead escapement will be monitored annually. If there is a downward trend below the objective then restrictions to the fishery will be imposed. These restrictions can include reducing the bag limit,

restricting area and season openings, or even the complete closure of the river to steelhead harvest.

4(i)(D) Displays a biologically based rationale demonstrating that the harvest management strategy will not appreciably reduce the likelihood of survival and recovery of the ESU in the wild, over the entire period of time the proposed harvest management strategy affects the population, including effects reasonably certain to occur after the proposed actions cease.

The complete analysis of the biological impacts from the fishing regime is fully described in section 2 “Effects on ESA-listed Salmonids” of the LCR steelhead FMEP (ODFW 2001a). Below is a summary of NOAA Fisheries’ evaluation of the fishery impacts on listed juvenile and adult winter steelhead.

Adult Winter Steelhead

ODFW has implemented restrictive regulations permitting the retention of marked adult hatchery steelhead only and requiring the release of naturally produced (unmarked) adult steelhead. Furthermore, to reduce impacts from all the proposed fisheries to juvenile steelhead, ODFW has implemented restrictive regulations including catch and release for all unmarked trout, gear restrictions, timing restrictions, and consumptive fisheries restricted to marked trout only in the North Fork and Estacada reservoirs on the Clackamas River.

The information on the rate at which unmarked steelhead are encountered in the mainstem lower Willamette and tributary recreational fisheries is limited. The best information suggests that encounter rates are typically in the range of 5-30% (ODFW 2001b). A conservative rate of 50% was used by ODFW in their fisheries mortality estimates. Applying the 5% hook and release mortality rate to the interception rate, an estimated 2.5% of the average annual return is lost to hook and release mortality. Additional fisheries mortality from angler non-compliance (illegal harvest) is expected to be very low due to the greater than 90% angler compliance to fisheries regulations.

The 5% catch-and-release mortality rate is conservative for steelhead based on the mortality estimate for steelhead of 3.4% developed by Hooton (1987). Catch-and-release mortalities tend to increase as water temperatures increase with over 80% of the observed mortalities in one study occurring above 21 degrees C (Taylor and Barnhart 1997). The adult naturally produced winter steelhead do not enter the rivers until December and are not exposed to fisheries when water temperatures are above 21 degrees C. The estimated catch-and-release mortality rate for naturally produced winter steelhead should, therefore, not be greater than the 5% estimate.

Past fisheries mortality rates for adult steelhead in the LCR River prior to the start of mandatory unmarked fish release regulations implemented in 1992 were estimated to be approximately 40% (ODFW 2001a). This is similar to estimates developed by Cramer *et al.* (1997), in their review

of harvest rates of adult steelhead in sport fisheries in Oregon and Washington prior to wild (unmarked) steelhead release regulations who concluded that harvest rates on wild winter steelhead were in the neighborhood of 50%. It is expected that the annual harvest impacts under the FMEP will remain at less than 2.5 % annually, well below the 40% that was observed in the past.

Juvenile Winter Steelhead

Steelhead occupy many waters that are also occupied by resident trout species, and it is not possible to visually separate juvenile steelhead from similarly-sized stream-resident rainbow trout. Because juvenile steelhead and resident rainbow trout are the same species, are similar in size and have the same food habits and habitat preferences, it is reasonable to assume that catch-and-release mortality studies on stream-resident trout also apply to juvenile steelhead. Where angling for trout is permitted, catch-and-release fishing with prohibition of use of natural or synthetic bait will reduce juvenile steelhead mortality more than any other angling regulatory change. Many studies have shown trout mortality to be higher when using bait than when angling with artificial lures and flies (Talyor and White 1992; Schill and Scarpella 1995; Mongillo 1984; Wydoski 1997; Schisler and Bergersen 1996). Wydoski (1997) showed the average mortality of trout when using bait to be more than four times greater than the mortality associated with using artificial lures and flies. Taylor and White (1992) showed average mortality of trout to be 31.4% when using bait versus 4.9% and 3.8% for lures and flies, respectively. Schisler and Bergersen (1996) reported average mortality of trout caught on passively fished bait to be higher 32% than mortality from actively fish bait (21%). Mortality of fish caught on artificial flies was 3.9%. In some fisheries that occur during the general trout season, larger hooks may reduce the efficiency of hooking juvenile steelhead because it will be more difficult for juveniles to swallow the bait (Muoneke and Childress 1994). Most studies have found little difference (or inconclusive results) in the mortality associated with using barbed versus barbless hooks, single versus treble hooks and different hook sizes (Schill and Scarpella 1997; Taylor and White 1992; Mongillo 1984). However, some investigators believe that the use of barbless hook reduces handling time and stress on hooked fish and adds to survival after release (Wydoski 1997). In summary, catch-and-release mortality of juvenile steelhead is expected to be less than 10% and approaches 0% when fishermen are restricted to use of artificial flies and lures with barbless hooks.

No retention of trout of any size is allowed in the streams within the LCR steelhead ESU. All trout caught must be released unharmed. After 1998, stocking of hatchery trout in waters where listed steelhead reside was terminated. The exceptions are North Fork and Estacada reservoirs (Clackamas River) where only adipose fin-clipped hatchery trout are stocked. Fisheries in both reservoirs allow only the retention of adipose fin-clipped hatchery trout. All unmarked trout must be released unharmed. Late-May openers are in place on steelhead streams to minimize the number of smolts exposed to trout fisheries. These management changes are expected to reduce the mortality of juvenile steelhead while they are rearing in streams. Prior to 1999, bait could be used during the general trout season (end of May through October) throughout the ESU. Since

hooking mortality studies (summarized above) have shown bait to result in markedly higher mortality rates than other gear types, there was concern that using bait could be off-setting the benefits of having a catch and release trout fishery. Therefore, the use of bait when angling for trout during the summer was prohibited after 1998. Anglers are now restricted to artificial flies and lures when fishing for trout in streams throughout the ESU.

Since the use of bait in adult steelhead and salmon fisheries has not been shown to result in higher mortality rates compared to artificial flies and lures (Hooton 1987), bait is still permitted in adult salmon and steelhead fisheries. However, in order to reduce the potential of hooking juvenile steelhead during adult salmon and steelhead fisheries, large sanctuary areas (approximately 75% of the ESU) have been implemented where no steelhead or salmon angling is allowed.

As a result of the non-retention of any trout in all streams in the ESU, fishing effort is much lower than in previous years. The elimination of catchable trout stocking and the restrictive fishing regulations has reduced fisheries impacts to a level where it is estimated that less than 1% of the juvenile steelhead present in the ESU will be handled in catch and release fisheries annually.

Past harvest impacts on juvenile steelhead from trout fisheries in the LCR ESU are unknown. Cramer *et al.* (1997) expressed the opinion that the greatest sport harvest of steelhead in recent times may have been on juveniles taken in trout fisheries, rather than on adults. This was likely the case in the Sandy and Clackamas Rivers considering the regulations and management practices in place for many years. For example, stocking of catchable trout and the resultant intensive trout fisheries occurred in the Sandy and Clackamas Rivers, Scappoose and Johnson Creeks for many decades until this practice was discontinued in the 1990's. These important winter steelhead spawning and rearing streams likely received substantial impacts on steelhead production during that time as a result of fishery and ecological effects of trout stocking and resultant fisheries. After 1998, all trout fishing in the LCR ESU has been mandatory catch and release and no bait is allowed. The more restrictive angling regulations now implemented and proposed to continue into the future will provide appreciably greater protections to adult and juvenile steelhead.

Non-target sport fisheries for spring chinook and warmwater fishes

Sport fisheries for spring chinook salmon in the Willamette River Basin occur in the Multnomah Channel and the lower Willamette River upstream to Willamette Falls. Chinook fisheries are open year round or reopen under permanent regulations on January 1 in most areas and commence as fish enter the area, beginning with the Multnomah Channel and lower Willamette River, in February and March. Spring chinook passage at the Willamette Falls occurs starting in April. The fisheries in the Willamette mainstem, below the falls, may incidentally intercept adult winter steelhead during April and May. Juvenile steelhead are present in the Willamette mainstem during the spring chinook fishery. Gear restrictions and seasonal closures are in effect

to protect juveniles. Fisheries for spring chinook salmon are covered under the Upper Willamette Chinook FMEP (ODFW 2000b), approved in February 2001.

The warmwater game fish and non-game fish fisheries, also proposed in the FMEP, are focused in the lower Willamette River and lower sections of some lower Willamette River tributaries. In the lower Columbia River tributaries, warmwater fisheries are concentrated in backwaters and sloughs, which are generally not hospitable rearing areas for juvenile salmonids. Fisheries are also most active during warm summer months after spring migrant juvenile steelhead have left the system. The proposed warmwater fisheries are expected to have a very low impact and not reduce the likelihood for survival and recovery of the naturally produced populations in the LCR ESU.

The ODFW analyzed the effects of fishery impacts greater than those proposed for the LCR steelhead management area. They found that the probability of extinction for nearly all steelhead populations modeled throughout Oregon was zero when total annual harvest rates were restricted to 20% or less (Chilcote 2001). The probability of extinction was defined in the model, as the number of times in a 1000 model runs that the population reached zero in last six years of a 50 year period, at various harvest rates. The model showed that once harvest impacts increase above 20%, the probability of extinction increases substantially for all the populations. The expected fisheries mortality on naturally produced LCR steelhead in all Columbia River mainstem fisheries (commercial and mainstem sport) and in tributary sport fisheries is expected to be less than 5% of the naturally produced winter steelhead annually.

This level is not expected to appreciably reduce the likelihood of survival and recovery of listed steelhead based on the information about the population presented in the FMEP. Specifically, the number of naturally produced winter steelhead returning to the Sandy River has remained almost twice the interim critical threshold for the last six years and has shown an increasing trend in the last few years. The number of naturally produced winter steelhead returning to the Clackamas River has averaged approximately 1.5 times the critical threshold for the last six years, reflecting poor returns in 1996 and 1999. The implementation of the restrictive fishery actions in this plan are not expected to appreciably reduce the likelihood of survival and recovery of the LCR steelhead populations in Oregon.

4(i)(E) Includes effective (a) monitoring and (b) evaluation programs to assess compliance, effectiveness, and parameter validation.

The performance indicators for wild escapement will be measured as counts of naturally produced steelhead past Marmot and North Fork dams and the Bonnie Falls fishway on the North Fork of Scappoose Creek. Additional performance indicators include downstream migrant traps in both the upper Sandy and Clackamas basins that generate supplemental fish population information in the manner of collection estimates from smolt traps operated by the U.S. Forest

Service and Portland General Electric. Information is summarized annually and provided to ODFW for further analysis.

Salmon/steelhead punch cards are used to determine total harvest, total effort and a population estimate. Other monitoring that will be implemented to provide additional data (if funding is obtained) includes annual statistical creel programs on the Clackamas and Sandy Rivers, designed to provide a comprehensive analysis of the fishery utilizing: records of angling effort, catch, harvest, hatchery/wild ratio and the distribution of angler pressure; annual foot, boat and aerial spawning ground surveys describing the location and abundance of adult spawning; and the development of a population model allowing a total population prediction based on the Marmot and North Fork dam counts (see section 3.2 of the FMEP for details).

In addition to the monitoring programs discussed in the FMEP, there are numerous other ongoing projects funded by other agencies or programs which provide additional information useful for fisheries management of LCR steelhead.

4(i)(F) Provides for (a) evaluating monitoring data; and (b) making any revisions of assumptions, management strategies, or objectives that data show are needed will be made.

As fully explained in sections 3.5.1 and 3.5.2 of the FMEP, North Willamette Watershed District staff in consultation with appropriate ODFW Headquarters staff will annually evaluate and report on the monitoring data. These reports will include biological and fishery information from the previous year and an assessment of how the fisheries performed with respect to the objectives and guidelines established in the FMEP. In addition, a comprehensive review of the FMEP is scheduled to occur every 5 years to evaluate whether the fisheries and naturally produced populations are performing as expected. Comprehensive review will be repeated at 5 year intervals thereafter until such time as the steelhead stocks are recovered and delisted. The comprehensive review will allow management assumptions to be further verified and allow new information or findings to be incorporated into the FMEP. This includes the determinations from formal recovery planning efforts by the Technical Recovery Teams.

One likely change will be from the decommissioning of Marmot and Little Sandy Dams beginning in 2007. ODFW and NOAA Fisheries will remain actively involved with the process that drives the decisions on fish passage management issues in the basin, and the appropriate parties will consult with NOAA Fisheries on these issues as they arise. It is not useful to describe management response to this action at this time, as the type and magnitude of effects is only broadly predictable. Because this action is intended to improve the status of the natural spawning populations in the Sandy River subbasin, additional opportunities for fishery harvest will likely be identified; any substantial changes in harvest in the subbasin and their likely effects on listed species will be evaluated at that time.

4(i)(G) Provides for (a) effective enforcement, (b) education, ©) coordination among involved jurisdictions.

The enforcement program is described in section 3.4 of the FMEP. The Fish and Wildlife Division of the Oregon State Police (OSP) is responsible for enforcement of fish and wildlife regulations in the State of Oregon. The OSP and ODFW work together to develop enforceable regulations that will achieve fish and wildlife resource management goals. The Fish and Wildlife Enforcement Division currently includes 128 Supervisors and Troopers. There are 16 Supervisors and Troopers dedicated to the Lower Columbia and Lower Willamette Rivers.

ODFW and OSP work together to facilitate enforcement of resource management goals through an annual cooperative enforcement planning process. Troopers meet annually with local biologists to set enforcement priorities by species, developing tactical plans addressing priority issues related to compliance levels sufficient to protect resources and meet management goals. The results of each tactical plan are quantified and compared to the compliance level considered necessary to meet management goals. Compliance goals are typically estimated based on the percentage of angler contacts with no noted violations and the tactical plans are adjusted as needed to meet management goals.

Protection of adult naturally produced steelhead are assigned a high priority for compliance enforcement. Smolt protection is also a high priority during their migration from spawning beds to the ocean. Troopers conduct bank and boat patrols to check and assist anglers. ODFW personnel check anglers during creel, carcass and spawning ground surveys. Observations by OSP indicate angler compliance with regulations is high, in excess of 90%.

The FMEP describes measures that will be taken to inform and educate the public about the fisheries (section 3.3 of the FMEP). Fishing regulations are available through license vendors and on the ODFW website. Proposed regulations changes are publicized and subject to comment by the general public. Additionally ODFW publishes "The Oregon Sport Fishing Regulations Pamphlet" and emergency notices for distribution by license vendors and ODFW regional offices.

In addition to the above, ODFW posts information signs at fishery access points and delivers handouts on hatchery fin-clip combinations to local sporting goods outlets. Districts supply information via phone calls and/or faxes to key constituents and to local fishing news publications. Further, ODFW operates an information line, a tape-recorded hotline and an Internet web page featuring timely information. Each basin within the ESU has developed a Subbasin Fish Management Plan. These plans are developed with the assistance of a Public Advisory Committee represented by members of user groups and members of the community at large. These subbasin plans address the management of each basin and are dynamic documents open to review as needed.

Another avenue for public outreach by the state of Oregon and ODFW is conducting a broad-based watershed recovery effort called the Willamette Restoration Initiative (WRI). The WRI is a new effort seeking to promote, integrate and coordinate efforts to protect and restore the health of the watershed. Designed as a public/private partnership, the WRI works closely with state and federal agencies, while bring a new focus to exploring the restoration interests and capabilities of business, landowners, non-profit organizations, local governments and watershed councils in the basin.

4(i)(H) Includes restrictions on resident and anadromous species fisheries that minimize any take of listed species, including time, size, gear, and area restrictions.

The fisheries within the Management Area specified in the FMEP (sections 1.2.1 and 2.1) include many fishing restrictions specifically designed to control impacts on adult and juvenile steelhead. Section 4(i)(D), above, provides a detailed assessment of angling regulations and the effect on juvenile and adult steelhead. These regulations are currently in effect as Oregon state law and will remain in effect in the foreseeable future. In the future, if there are proposals to change existing angling regulations, ODFW, will first confer with NOAA Fisheries before adoption, as stated in the FMEP, and in section 223.203 (4)(iii) of the 4(d) Rule for LCR steelhead.

4(i)(I) Is consistent with other plans and conditions established within any Federal court proceeding with continuing jurisdiction over tribal harvest allocations.

The actions and objectives of this FMEP do not directly impact Federal tribal trust resources. Tribal trust resources do not exist for LCR winter steelhead in the Willamette Basin. There are no existing court orders with continuing jurisdiction over tribal harvest allocations that are relevant to the implementation of the proposed FMEP.

(4)(ii) The state monitors the amount of take and provides to NOAA Fisheries a report on a regular basis.

As described in section 3.5.1 of the FMEP, ODFW will assess compliance with the provisions in the FMEP annually. The escapement of winter steelhead will be monitored every year with restrictions to fisheries made inseason if counts of naturally produced steelhead indicate additional conservation measures are necessary. An annual report summarizing their findings will be provided to NOAA Fisheries by March 31st of each year.

A comprehensive review of the FMEP will occur every five years. These reviews will evaluate whether the FMEP is accomplishing the stated objectives and revise management strategies if necessary. This review will be in cooperation with NOAA Fisheries.

(4)(iii) The state confers with NOAA Fisheries on its fishing regulation changes.

As stated in section 3.5.1 of the FMEP, ODFW will confer with NOAA Fisheries on any fishing regulation changes that may affect listed steelhead in the LCR steelhead management area. Information on the proposed regulation change will be provided at least 2 weeks in advance of the decision being made.

(4)(iv) Written concurrence of the FMEP.

If the concurrence is made that the FMEP adequately addresses all of the criteria specified in limit #4 of the 4(d) Rule, NOAA Fisheries will issue a letter of concurrence to ODFW, which will specify the necessary implementation and reporting requirements.

Processing of the Public Comments Received

As required in (4)(iii) of section 223.203 of the 4(d) Rule, before a FMEP can be approved or amended, the public must have had an opportunity to review and comment on the FMEP. A Notice of Availability and Request for Comment on ODFW's LCR steelhead FMEP was published on May 4, 2001 (66 FR 22534). NOAA Fisheries received no public comments.

RECOMMENDED DETERMINATION

As evaluated above, the Salmon Recovery Division recommends that the Regional Administrator determine that the FMEP for fisheries potentially affecting ESA-listed LCR steelhead submitted by ODFW adequately addresses all of the criteria established for limit #4 of the 4(d) Rule. If the RA so finds and approves the FMEP, the take prohibitions would not apply to fisheries implemented in accordance with the approved FMEP and NOAA Fisheries' letter of concurrence.

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